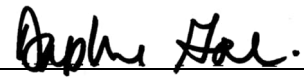


OPERATION AND MAINTENANCE MANUAL FOR STORMWATER MANAGEMENT FACILITIES

44 NEWKIRK STREET
BLOCK 10802
LOTS 25, 26, 27, 28, 29, 30, 31 AND 32
CITY OF JERSEY CITY
HUDSON COUNTY, NEW JERSEY

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SIGNATURE

OCTOBER 18, 2023

Partner Project Number: 17258071-CI

Prepared for:

INTERLAND CAPITAL, LP.



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PART I - PROJECT DETAILS

INTRODUCTION AND DESCRIPTION OF FACILITIES

The site is located on the north side of Newkirk Street at the intersection of Newkirk Street and Baldwin Avenue; Block 10802, Lots 25-32, in the City of Jersey City, Hudson County, New Jersey. The 0.3646 acre property is bounded on the west and north by residential dwellings, on the east by Baldwin Avenue and on the south by Newkirk Street. The existing site is occupied by single-family dwellings, a gravel parking lot and small lawn areas. The dwellings and gravel parking lot will be demolished and when developed, the Site will consist of a 12-story, mixed-use (residential and retail) structure.

A storm drainage system will be constructed on site in order to capture and attenuate stormwater runoff from the proposed improvements. A proposed underground storm water detention basin in conjunction with extensive green roofs will provide the required reductions in runoff rates.

This manual has been developed using the NJDEP “Stormwater Management Facilities Maintenance Manual” as a guide. The manual is intended to provide guidance and instruction for the maintenance of the storm water management facilities which will be constructed as part of the project.

PROJECT CONTACTS

Property Owner

InterLand Capital, LP
323 Main Street, 2nd Floor
Chatham, NJ 07928
Tel: 626-923-9845

Responsible Representative

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InterLand Capital, LP
323 Main Street, 2nd Floor
Chatham, NJ 07928
Tel: 626-923-9845

City Engineer

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Design Engineer

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611 Industrial Way West, Suite A
Eatontown, New Jersey 07724
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PART II – INSPECTION AND DESIGN

ROUTINE INSPECTION AND MAINTENANCE OF THE STORMWATER MANAGEMENT FACILITIES

The underground storm water detention basin has been designed to control stormwater and prevent flooding. Without proper routine inspection and maintenance, the basin may lose some or all of its capability to function to its full capacity. Lack of adequate maintenance at this facility could lead to failure of the basin. Regularly scheduled maintenance inspections of the facility should be performed by a qualified Professional Engineer at least twice each year. The primary purpose of these inspections is to ascertain the operational condition of the facility. Inspections will also provide information on the effectiveness of regularly scheduled preventative and aesthetic maintenance procedures and will help to identify where changes in the extent and scheduling of the procedures are warranted. Finally, the facility inspections should also be used to determine the need for and timing of corrective maintenance procedures.

The extensive green roofs provide additional storm water quantity control. Without proper routine inspection and maintenance, the roofs may lose some or all of their capability to function to full capacity. Lack of adequate maintenance at this facility could lead to failure of the green roofs. The primary purpose of these inspections is to ascertain the operational condition of the facility. Inspections will also provide information on the effectiveness of regularly scheduled preventative and aesthetic maintenance procedures and will help to identify where changes in the extent and scheduling of the procedures are warranted. The facility inspections should also be used to determine the need for and timing of corrective maintenance procedures. Bi-weekly inspections are required when establishing or restoring vegetation. A minimum of one inspection during the growing season and one inspection during the non-growing season are required to insure the health and density of the vegetation. Additional inspections are required after major weather events including high winds and lightning strikes. Trimming of the vegetation must be performed on a regular basis based on specific site conditions. Vegetative cover must be maintained at 85%. Any damaged vegetation

must be replanted immediately. Access to the main roof green roof is via the elevator or building stairwells. Access to the second-floor green roof is via an access ladder. Access to the upper roof green roof is via a roof hatch at stairwell #1. The following is a summary, in table form, for the owner's responsibility on inspections and maintenance for the proposed storm water management facilities.

TABLE 1.01

Facility	Inspection Schedule
1. Roof Leader Collection System	Inspect and clean annually.
2. Storm Inlets and Manholes	Inspect and clean annually.
3. Basin and Components	Inspect quarterly and after 1" rainfall.
4. Green Roofs	Inspect and clean quarterly and after 1" rainfall including drainage gutters Inspect structural components annually Inspect vegetation biannually and after major weather events Inspect growing medium annually

All debris, trash, sediment and other waste material must be disposed of at suitable disposal/recycling sites in compliance with applicable local, state and federal waste regulations.

TABLE 1.02

Preventative Maintenance	Schedule
1. Grass Cutting	Bi-monthly, month minimum
2. Grass and Vegetative Cover Maintenance	Annually
3. Removal and Disposal of Trash and Debris	Monthly
4. Sediment Removal and Disposal	Annually and after major storm
5. Inspection	Annually

Corrective Maintenance	Schedule
1. Removal of Debris and Sediment	As needed
2. Structure Repairs	As needed
3. Dewatering	As needed
4. Sidewalks and Paving	As needed

Aesthetic Maintenance	Schedule
1. Graffiti Removal	As needed
2. Landscaping Maintenance	Bi-Monthly, monthly minimum
3. Control of Weeds	As needed

Routine maintenance of these facilities should be separated into two basic types: Functional Maintenance and Aesthetic Maintenance. Functional Maintenance is further broken down into two categories: Preventative and Corrective. Aesthetic Maintenance, which is necessary to maintain the visual appeal and aesthetic quality of the facilities, should be incorporated on the same schedule as the preventative maintenance efforts. Listed below are the Preventative, Corrective and Aesthetic Maintenance Procedures to be performed on a routine basis.

A. PREVENTATIVE MAINTENANCE PROCEDURES

The purpose of Preventative Maintenance is to ensure that the stormwater management aspects of the basins remain operational and safe at all times, and to minimize the need for emergency or corrective maintenance. These procedures are as follows:

1. Maintenance of Adjacent Areas

Grass areas, trees, and shrubs require periodic fertilizing, de-thatching and soil conditioning in order to maintain healthy growth. The application of fertilizers should follow manufacturer's instructions to reduce run-off of these compounds into the basin. Additionally, provisions should be made to re-seed and re-establish grass cover in areas damaged by sediment accumulation, stormwater flow, or other causes. These tasks should be performed, or at least evaluated, on a quarterly basis.

2. Removal and Disposal of Trash and Debris

A regularly scheduled program of debris and trash removal will reduce the chance of outlet structures, trash racks, catch basins and other components becoming clogged and inoperable during storm events.

Additionally, removal of trash and debris will prevent possible damage to vegetated areas and eliminate potential mosquito breeding habitats. Debris and trash must be properly hauled off the site and transferred to an approved disposal site. These tasks should be performed on a quarterly basis and after any major storm event.

3. Sediment Removal and Disposal

The basin and green roofs should be evaluated for excessive deposition of sediment. Accumulated sediment should be removed before it threatens the storage volume of the basin or inhibits the functioning of the green roofs.

Before desilting activities are performed, consideration should be given to evacuating all standing water from the basin. This may be accomplished by pumping the water out of the basin. Disposal of sediment must comply with all local, county, state, and federal regulations. Only suitable disposal sites should be utilized. These tasks should be performed as needed. If stable soil conditions exist around the basin, sediment deposition should not be a problem. Should a recurrent problem develop, the inspector should identify the upstream sources of sediment and recommend required stabilization measures. Sediment buildup in drainage swales and on vegetative filter strips should also be periodically removed.

4. Elimination of Potential Mosquito Breeding Habitats

The most effective mosquito control program is one that eliminates potential breeding habitats. Almost any stagnant pool of water can be attractive to mosquitoes, and become the source of a large mosquito population. A maintenance program dedicated to eliminating potential breeding areas is certainly preferable to chemical means of controlling mosquitoes. The most important maintenance function is removal of all obstructions to natural flow patterns before stagnant water conditions can develop.

B. CORRECTIVE MAINTENANCE

1. Removal of Debris and Sediment

Sediment, debris, and trash which threatens the discharge capacity of the basin or green roof should be removed immediately and properly disposed of. As noted previously, it is recommended that all water be evacuated from the basin before any significant amount of sediment, settled debris or trash is removed from the basin. The lack of an available disposal site should not delay the removal of trash, debris, and sediment. Temporary disposal sites should be utilized if necessary.

2. Structural Repairs

Structural damage to outlet and inlet structures and green roofs as a result of vandalism, flood events, or other causes, must be repaired promptly. The urgency of the repairs will depend upon the nature of the damage and its effects on the safety and operation of the facility. The analysis of structural damage and the design and performance of structural repairs should only be undertaken by the consulting Professional Engineer.

3. Erosion Repair

Vegetative cover or other protective measures are necessary to prevent the loss of soil due to the forces of wind and water. Where a re-seeding program has not been effective in maintaining a non-erosive vegetative cover, or other factors have exposed soils to erosion, corrective steps should be initiated to prevent further loss of soil that may result in danger to the stability of the facility. Soil loss can be controlled by a variety of materials and methods, including riprap, gabion lining, sod, seeding, concrete lining and regrading.

4. Snow and Ice Removal

Accumulations of snow and ice can threaten the functioning of the inlet, outlet, and emergency spillway. Provision of the equipment, material, and personnel to monitor and remove snow and ice from critical areas will assure the function of the facility during the winter months.

C. AESTHETIC MAINTENANCE PROCEDURES

1. Graffiti Removal

The timely removal of graffiti will restore the aesthetic quality of the retaining walls. Removal can be accomplished by paint or other cover, or removal with scrapers, solvents or cleansers. Timely removal is important to discourage further graffiti and other acts of vandalism.

2. Landscape Maintenance

The lawn areas shall be mowed on a regular basis as necessary to maintain the lawn at a height of 2" to 3". These areas shall also be fertilized twice a year, once in the spring and once in the fall. Fertilizer for lawn areas shall be 10-20-20 applied at a rate of 14 lbs. per 1,000 s.f. or as determined by a soil test. Any bare, dead, or damaged lawn areas shall be reseeded in accordance with the original procedures as outlined in the Soil Erosion and Sediment Control Plans using the same mix and seeding rates. Stabilization of bare or damaged areas shall be done in a timely fashion so as to avoid exposing the soil to erosion.

If season prevents the re-establishment of turf cover, exposed areas should be stabilized with straw or salt hay mulch as described in the Soil Erosion and Sediment Control Plans, until permanent seeding can be done. Seeding can be done between May 1st and August 15th, only if adequate water is provided.

D. INLET MAINTENANCE PROCEDURES

Sediment, debris, trash, and grass clippings in "common" drainage swales must be removed immediately. These areas shall be inspected on a regular basis throughout the year by the owners to ensure that any swales and inlets are free of blockages.

E. MAINTENANCE EQUIPMENT AND MATERIALS

1. Grass Maintenance Equipment

- a. Riding Mowers
- b. Hand Mowers
- c. Gas Powered Trimmers
- d. Gas Powered Edgers
- e. Seed Spreaders
- f. Fertilizer Spreaders
- g. De-thatching Equipment
- h. Pesticide and Herbicide Application Equipment
- i. Grass Clipping and Leaf Collection Equipment

2. Vegetative Maintenance Equipment

- a. Saws
- b. Pruning Shears
- b. Hedge Trimmers

- c. Wood Chippers
 - d. Aquatic Weed Harvester (owned/operated by subcontractor)
- 3. Transportation Equipment
 - a. Trucks for Transportation of Materials
 - b. Trucks for Transportation of Equipment
 - c. Vehicles for Transportation of Personnel
- 4. Debris, Trash and Sediment Removal Equipment
 - a. Loader
 - b. Backhoe
 - c. Grader
 - d. Dredging Equipment
 - e. Portable Pump for Dewatering
- 5. Miscellaneous Equipment
 - a. Shovels
 - b. Rakers
 - c. Picks
 - d. Wheel Barrows
 - e. Fence Repair Tools
 - f. Painting Equipment
 - g. Gloves
 - h. Standard Mechanics Tools
 - i. Tools for Maintenance of Equipment
- 6. Materials
 - a. Topsoil
 - b. Fill
 - c. Seed
 - d. Soil Amenities (Fertilizer, Lime, etc.)
 - e. Chemicals (Pesticides, Herbicides etc.)
 - f. Mulch
 - g. Paint Removers
 - h. Spare Parts for Equipment

F. CHECKLIST AND LOGS

Included in this report are Checklists and Logs regarding various aspects of maintenance and inspection. They include:

The MAINTENANCE WORK ORDER AND CHECKLIST is a comprehensive form for recording both required and completed maintenance work.

The MAINTENANCE LOG provides a summary table for recording of all maintenance work at the basin and green roof.

The INSPECTION CHECKLIST provides a comprehensive checklist of inspection items for use by the inspectors.

The INSPECTION LOG provides a summary table to recording the results of all inspection to the basin.

PART III APPENDICES

A-1

**MAINTENANCE WORK ORDER AND CHECKLIST FOR
STORM WATER MANAGEMENT FACILITIES**

Maintenance Work Order and Checklist for Stormwater Management Facilities

Name of Facility: 44 NEWKIRK STREET

Location: 44 NEWKIRK STREET JERSEY CITY, NJ

Date: _____

Crew: _____

Work Started:

Date: _____ Time: _____

Equipment: _____

Work Completed:

Date: _____ Time: _____

Weather: _____

Total Manhours of Work: _____

A. Preventative Maintenance

Work Items	Items Required (X)	Items Done (X)	Comments and Special Instructions
------------	----------------------------	------------------------	-----------------------------------

1. Grass Cutting

A. Bottoms			
B. Embankments and Side Slopes			
C. Perimeter Areas			
D. Access Areas and Roads			
E. Other:			

2. Grass Maintenance

A. Fertilizing			
B. Re-Seeding			
C. De-Thatching			
D. Pest Control			
E. Other:			

3. Vegetative Cover

A. Fertilizing			
B. Pruning			
C. Pest Control			
D. Other:			

4. Trash and Debris Removal

A. Bottoms			
B. Embankments and Side Slopes			
C. Perimeter Areas			
D. Access Areas and Roads			
E. Inlets			
F. Outlets and Trash Racks			
G. Other:			

Work Items	Items Required (X)	Items Done (X)	Comments and Special Instructions
5. Sediment Control			
A. Inlets			
B. Outlets and Trash Racks			
C. Bottoms			

6. Mechanical Components			
A. Valves			
B. Sluice Gates			
C. Pumps			
D. Fence Gates			
E. Locks			
F. Access Hatches			
G. Other:			

7. Elimination of Potential Mosquito Breeding Habitat			

8. Pond Maintenance			
A. Aeration Equipment			
B. Debris & Trash Removal			
C. Weed Removal			
D. Other:			

9. Other Preventative Maintenance			
A.			
B.			
C.			

B. Corrective Maintenance

Work Items	Items Required (X)	Items Done (X)	Comments and Special Instructions
1. Removal of Debris & Sediment			
2. Structural Reports			
3. Dam, Embankment, & Slope Repairs			
4. Dewatering			

Work Items	Items Required (X)	Items Done (X)	Comments and Special Instructions
5. Pond Maintenance	<input type="checkbox"/>	<input type="checkbox"/>	
6. Control of Mosquitoes	<input type="checkbox"/>	<input type="checkbox"/>	
7. Erosion Repair	<input type="checkbox"/>	<input type="checkbox"/>	
8. Fence Repair	<input type="checkbox"/>	<input type="checkbox"/>	
9. Elimination of Trees, Brush, Roots, & Animal Burrows	<input type="checkbox"/>	<input type="checkbox"/>	
10. Snow & Ice Removal	<input type="checkbox"/>	<input type="checkbox"/>	

C. Aesthetic Maintenance

Work Items	Items Required (X)	Items Done (X)	Comments and Special Instructions
1. Graffiti Removal	<input type="checkbox"/>	<input type="checkbox"/>	
2. Grass Trimming	<input type="checkbox"/>	<input type="checkbox"/>	
3. Weeding	<input type="checkbox"/>	<input type="checkbox"/>	
4. Other:	<input type="checkbox"/>	<input type="checkbox"/>	

Remarks (Refer to Item No., If Applicable):

Work Order Prepared By: _____

Work Completed By: _____

A-2
MAINTENANCE LOG FOR
STORM WATER MANAGEMENT FACILITIES

Name of Facility: 44 NEWKIRK STREET
Location: 44 NEWKIRK STREET JERSEY CITY, NJ

[illegible]

(X) Completed

[illegible][illegible][illegible]

A. Bottoms									
B. Embankments and Side Slopes									
C. Perimeter Areas									
D. Access Areas and Roads									
E. Inlets									
F. Outlets and Trash Racks									
G. Other:									

[illegible]

[illegible][illegible][illegible][illegible]

B. Corrective Maintenance

Work Items

- [illegible]

C. Aesthetic Maintenance

Work Items

1. Graffiti Removal									
2. Grass Trimming									
3. Weeding									
4. Other:									

Remarks (Refer to Item No., If Applicable):

A-3
INSPECTION CHECKLIST FOR
STORM WATER MANAGEMENT FACILITIES

Inspection Checklist for Stormwater Management Facilities

Name of Facility: 44 NEWKIRK STREET

Location: 44 NEWKIRK STREET JERSEY CITY, NJ

Date: _____

Weather: _____

Facility Item	O.K. ¹	Routine ²	Urgent ³	Comments ⁴
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1. Embankments and Side Slopes

A. Vegetation				
B. Linings				
C. Erosion				
D. Settlement				
E. Sloughing				
F. Trash and Debris				
G. Seepage				
H. Aesthetics				
I. Other:				

2. Bottoms (Detention & Infiltration)

A. Vegetation				
B. Erosion				
C. Standing Water				
D. Settlement				
E. Trash and Debris				
F. Sediment				
G. Aesthetics				
H. Other:				

3. Low Flow Channels (Detention)

A. Vegetation				
B. Linings				
C. Erosion				
D. Settlement				
E. Standing Water				
F. Trash and Debris				
G. Sediment				
H. Other:				

Facility Item O.K.¹ Routine² Urgent³ Comments⁴

4. Ponds (Retention)

A. Vegetation				
B. Shoreline Erosion				
C. Aeration Equipment				
D. Trash & Debris				
E. Sediment				
F. Water Quality				
G. Other				

5. Inlet Structure

A. Condition of Structure				
B. Erosion				
C. Trash & Debris				
D. Sediment				
E. Aesthetics				
F. Other:				

6. Outlet Structure (Detention & Retention)

A. Condition of Structure				
B. Erosion				
C. Trash & Debris				
D. Sediment				
E. Mechanical Components				
F. Aesthetics				
G. Other:				

7. Emergency Spillway

A. Vegetation				
B. Lining				
C. Erosion				
D. Trash & Debris				
E. Other:				

8. Perimeter

A. Vegetation				
B. Erosion				
C. Trash & Debris				
D. Fences & Gates				
E. Aesthetics				
F. Other:				

9. Access Roads

A. Vegetation				
B. Road Surface				
C. Fence & Gates				
D. Erosion				
E. Aesthetics				

Facility Item	O.K. ¹	Routine ²	Urgent ³	Comments ⁴
10. Green Roof				
A. Trash & Debris				
B. Sediment				
C. Vegetation				
D. Erosion				
E. Growing Medium				
F. Aesthetics				
G. Other:				

10. Miscellaneous

A. Effectiveness of Exist. Maint. Program				
B. Dam Inspections				
C. Potential Mosquito Habitats				
D. Mosquitoes				
E.				
F.				
G.				

¹The item checked is in good condition, and the maintenance program is adequate.

²The item checked requires attention, but does not present an immediate threat in the facility function or other facility components.

³The item checked requires immediate attention to keep the facility operational or to prevent damage to other facility components.

⁴Provide explanation and details if columns 2 or 3 are checked.

Remarks(Refer to Item No., If Applicable):

Inspector: _____

A-4
INSPECTION LOG FOR
STORM WATER MANAGEMENT FACILITIES

Name of Facility: 44 NEWKIRK STREET
Location: 44 NEWKIRK STREET JERSEY CITY, NJ

[illegible]

Indicate Condition(i.e. 1, 2, or 3)

[illegible][illegible][illegible]

A. Vegetation									
B. Shoreline Erosion									
C. Aeration Equipment									
D. Trash & Debris									
E. Standing Water									
F. Water Quality									
G. Other:									

[illegible][illegible][illegible][illegible][illegible]

10. Green Roof

A. Trash & Debris											
B. Sediment											
C. Vegetation											
D. Erosion											
E. Growing Medium											
F. Aesthetics											
G. Other:											

10. Miscellaneous

A. Effectiveness of Exist. Maint. Program											
B. Dam Inspections											
C. Potential Mosquito Habitats											
D. Mosquitoes											
E.											
F.											
G.											

- 1 The item checked is in good condition, and the maintenance program is adequate.
- 2 The item checked requires attention, but does not present an immediate threat to the facility function or other facility components
- 3 The item checked requires immediate attention to keep the facility operational to prevent damage to other facility components

 Remarks (Refer to Item No., If Applicable):

A-5

ANNUAL MAINTENANCE ESTIMATE

MAINTENANCE ESTIMATE

ENGINEER'S ESTIMATE

[illegible]